

BIOLOGICAL NOTES

ON SOME

PLANIPENNIA

FROM JAVA

BY

EDW. JACOBSON.

The following observations were made during my stay in Java. The insects referred to, have been recorded by the late Dr. H. W. van der Weele in a systematic paper: »Mecoptera and Planipennia of Insulinde« in the Notes from the Leyden Museum Vol. XXXI pag. 1—100, to which publication I refer for systematic information.

Myrmeleon frontalis Burmeister.

I collected this species at Batavia and Semarang, and all along the littoral part of the island it is of very common occurrence.

Its metamorphosis does not seem to be bound to a fixed season, as the imagines as well as their larvae are to be met with all the year round.

The imagines have nocturnal habits, and can often be

captured under the light of the lamp, by which they are attracted. During daytime they hide in covered places, pressing their bodies against the stalks of plants or grass-blades, and in this way are so well concealed, that, during all my long sejour in Java, I only found a few imagines in daylight, although they are common enough.

The larva of *Myrmeleon frontalis* has the same curious and well-known habit as most of the larvae of other Myrmeleonidae, which living in dry earth or sand, move backwards, and make pitfalls to secure their prey. The larva lives in places sheltered from the rain, as it cannot make pitfalls were the sand is wet or damp. Hence the soil at the base of a wall, below the eaves, frequently harbours these insects. They may be found in great numbers under the sheltered galleries of houses, where the cement-floors have crumbled to dust, and are often so numerous, that on one occasion 70 pitfalls were counted by me on one square meter.

The smallest larvae I found had a length of about 2 mm. The colour of the young larva is of a greyish brown, and it is covered all over with bristles and spines, to which the particles of dust and sand adhere. The adult larva is about 11 mm. in length; very good figures of a young and a full-grown larva can be found in the above mentioned paper of Dr. van der Weele.

I have not been able to ascertain the number of moults the larva has to go through before reaching maturity. Neither is the duration of the metamorphosis known to me, but concluding from what I observed of the larvae, hatched by me, I think that the time in which the metamorphosis can be completed depends on the supply of food. A larva abundantly fed, turned to a pupa in the course of 3 to 4 months, whereas one of about the same size, but which I supplied with very little food at long intervals, took nearly a year for its completion. It is known, that the larvae of

Myrmeleonidae are capable of sustaining prolonged fasts, apparently without any harm.

The Javanese name of the larvae is: »oundour-oundour«, derived from *moundour*, which means to go backwards, after their well known mode of locomotion.

The cocoon is spherical, and has a diameter of about $7\frac{1}{2}$ mm. It is made in the dry and loose soil, and spun of white silk. The opening, from which the imago emerges, is not cut out by the pupa, as has been, hitherto, generally supposed, but I found, that, in making the cocoon, the larva already provides for a trapdoor, consisting of a semi-circular flap, on one side (the hinge) continuous with the cocoon itself, and on the three other sides fastened with a few threads only. This trapdoor is easily pushed open by the pupa when emerging from the cocoon.

The pre-existence of the trapdoor can be easily proved, by pulling at a newly finished cocoon in different places with a pair of tweezers. The trapdoor will then soon be found to yield to a gentle pull, whereas the other parts of the cocoon offer a greater resistance, before a fragment can be torn from them. This arrangement is not only found with *Myrmeleon frontalis*, but all the other species of Myrmeleonidae, I observed in Java, showed the same structure of the cocoons. It is therefore very probable to me, that it is a general habit of the Myrmeleonidae (and also of another family of the *Planipennia*, as will be seen further on) that it is not the pupa or imago, which, with its mandibles, cuts a hole in the cocoon, as an exit for the imago, but that the larva, in spinning the cocoon, already provides for a trapdoor.

The pupa, of which Dr. van der Weele has given a figure in his paper, is, when hatched, yellowish with brown spots; it is curved, and has a length of only 6 mm. When it has reached maturity, it acquires the darker colour of the imago, stretches itself, and pushes open the trapdoor. Then only the

imago casts off the pupal skin, which is always found to protrude halfway out of the trapdoor. The pupal stage lasts from 2 to 3 weeks. After the pupa has turned into an imago, the larval excrement is expelled in the shape of a pale grey bar of 3 mm. length.

Although I often kept pregnant females in confinement, I never observed the deposition of the eggs. Mature eggs, which I took from the ovaries of female Myrmeleons, had a length of $1\frac{1}{4}$ mm. and a diameter of $\frac{3}{4}$ mm. Their shape is oval and the colour of a light yellow hue.

Chrysopa jacobsoni v. d. Weele.

I reared this species from the egg at Batavia in October and November, and the metamorphosis, as described below, will probably be similar for all the other species of the genus *Chrysopa*.

I found a batch of 21 eggs fastened to a bamboo stick on the 7th of October. As usual with *Chrysopa*-eggs, they were planted on long stalks, consisting of a very thin, though stiff thread, much resembling the anthers of flowers. The stalks, of hyaline colour, are 4 mm. in length and have a diameter of 0,1 mm. The eggs, of a light brown colour, are $1\frac{1}{2}$ mm. long, with a diameter of 0,3 mm.

The next day the eggs were attacked by mites, which were found to have emptied a number of them.

The young larvae emerged on the 8th of October. They first remained perched on the egg-shells, with the tip of the abdomen attached to it, and the head turned downwards along the stalk. These young larvae (see the figure in Dr. van der Weele's paper) have a yellowish red colour, with dark brown spots on the body and their length is about 2 mm. Interesting are the long antennae, which have the same length as the enormous mandibles, the short dactyliform processes on each segment, and the long cylindrical pygidium.

The pygidium is used by the insect during its larval life to attach itself to smooth surfaces, by the aid of a sticky fluid, excreted at its tip. This proceeding can easily be watched from the back of a glass plate, on which the insect is made to move. When irritated, the larva likewise excretes a drop of this fluid, which can be drawn out into threads. Most likely it is produced by the same glands that furnish, later on, the silk for the cocoon, which is spun by the aid of the pygidium.

The larvae are of voracious habits. Some small Ephemeridae, which I provided for them, were immediately attacked and sucked dry. Most larvae were constantly running about in a hurry, covering their bodies with all sorts of small debris they could find, as pieces of egg-shells, fibres, and the skins of their victims. They took up this refuse with their mandibles, then, throwing back their heads, they deposited it on the bristles of their backs. Probably these objects only hold on by force of adhesion, as they are not fastened in any way, neither by threads produced by the insect itself, nor by the sticky fluid, excreted from the pygidium, of which fact I convinced myself repeatedly. With a small brush the objects, accumulated on the back of the insect, could easily be removed, and showed no trace of being stuck on. I once observed a larva putting pieces of a spider's web, which it found on a leaf, on to its back, and I presume, that this habit has led some observers to the wrong conclusion, that the insect fastens the curious covering to its back with the aid of its own spinning threads.

On the evening of the first and second day after hatching, all the larvae returned to the egg-shells on the stalks, and rested there in the attitude above mentioned.

On October 12th they refused to accept food, became sluggish, and moulted on the 13th. After each ecdysis their appetite seemed to increase, and I had work enough to provide for

sufficient Aphids and other small insects. It was interesting to watch how they turned their victims on their mandibles as on a broach, emptying them entirely, so that nothing was left but the skin. They did not even spare each other; for one of the larvae was killed and sucked dry by its fellows.

On October 17th they moulted for the second time. As the moulting larvae were often falling victims to those already having moulted, their number was gradually reduced, and in order to avoid wholesale slaughter, I had to recur to single confinement.

When casting its skin, the larva makes undulating movements, and freshly moulted it rests curled up on its side, waiting till it has become dry and its integument more resistant. The eyes always remain dark, the other parts of the body being, directly after moulting, of a pale colour. The length of the second instar is about 4 mm.

Not being able to find enough Aphids for my prisoners, I fed them on scale insects, of which the white waxy exudations were soon used by the larvae to cover their backs with.

They now rapidly became full-grown and their appearance differed from that of the young larvae in the much shorter antennae, the darker colour of the head, the broader body and the shorter and broader pygidium, as will be seen from the figure, given in Dr. van der Weele's paper.

The ground colour is now a yellowish grey with pale yellow borders; the length is about 7 mm.

On October 21st three larvae made their cocoons, which were spherical, white, and covered with the refuse from the backs of the larvae.

When spinning the cocoon, the larva provides for a trapdoor in the same manner, as has been described above for the larva of *Myrmecleon frontalis*.

The pupa, figuring in Dr. van der Weele's paper, has a

pale yellow skin; the eyes are brown with a bronze shimmer, whereas the tips of the mandibles are of a dark colour. The length of the pupa is about 4 mm. In the cocoon there are always to be found one or two short cylindrical excrements from the larva.

On November 3rd and 4th the imagines emerged; the total metamorphosis, after hatching, having taken about 28 days.

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